ITD Workspace Development, Training and Custom Courseware Development Project

Design Standards Summary Report

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Introduction

The Idaho Transportation Department (ITD) relies heavily upon the use of InRoads® to aid in the design and development of roadway projects. The establishment of design standards can help to unify the way this software is used since these standards can be translated into a set of instructions, known in InRoads terminology as preferences, which serve to unify the appearance of the graphics that the program produces.

Professional Software Solutions, Inc. (ProSoft) has been employed to assist with the development of design standards and the implementation of InRoads software settings and resources that will correlate with the new ITD CADD standards. ProSoft will also create courseware for a custom training course, during which instruction will be provided to familiarize users with the ITD design standards and assist them with the migration to InRoads SelectCAD 8.2®. This project, which is expected to extend over the period of several months, will culminate in the deployment of new design standards and InRoads software to ITD CADD users.

The purpose of this document is to summarize all design standards development subtasks for Project Task 2. Design standards, in this context, are all standard conventions and workflows that have been developed for use with the InRoads roadway design software. A similar document was prepared to summarize CADD standards development subtasks for Project Task 1. On the pages that follow, each Task 2 subtask will be described with the problem identification (if applicable) and proposed recommendations. The information contained in this document will be used as the foundation for the development of InRoads software resources during Task 4.

Project Tasks

Following are descriptions, findings, and recommendations for the Task 2 subtasks. Since this information will be used as the foundation for the development of InRoads preferences, named symbologies, feature styles, and resource files, which will commence soon after the standards information that is contained herein has been approved, this document should be reviewed carefully to verify and confirm acceptance of the proposed design standards.

2.1 Meeting Summary Notes with ITD Comments for Design Standards

After receiving the meeting notes with ITD comments, ProSoft conducted an internal review. An planning meeting was held on January 9-10, 2003, with ProSoft team members to review the notes and findings, review the time line and project tasks, develop a strategy for completion of the tasks, and assign them to ProSoft personnel.

2.2.1 Review Design Manual

The ITD Design Manual contains all information that is considered pertinent to design practices for highway projects, including design criteria and specifications, project planning, environmental considerations, hydraulics specifications, and many other general categories of design-related material and specifications. Much is found in the Design Manual that is relevant to the set up of the InRoads resources. For example, superelevation, curve and passing lane criteria, slope treatment, and many other roadway design topics are addressed in a detailed manner. ProSoft has conducted a thorough review of this document in preparation for the development of InRoads resources.

2.2.2 Additional Standards to be Considered

The new design standards address all aspects of conventions and usage policies related to the InRoads software resources that will be created for the Idaho Transportation Department. Naming conventions have been developed for surfaces, geometry files, alignments, template libraries, templates, roadway libraries, and roadway definitions. Named symbologies and feature styles for InRoads SelectCAD 8.2 and preference settings have also been defined. In addition, survey feature codes have been identified for use with the InRoads Survey software that will be introduced during the course of the project. Finally, several workflow issues have been addressed that relate to the use of surfaces, geometry projects, and templates.

There are no additional conventions or processes that will be established with the initial release of the ITD CADD and design standards. However, in keeping with common industry practice, all standards should be reviewed periodically after implementation to verify that critical conventions and processes have been adequately addressed. ProSoft recommends that ITD conduct a review of its design standards no longer than six months from the time of implementation to determine whether or not additional development is necessary. After this initial review, the Idaho Transportation Department should set a regular release interval for standards revisions. Policies should be established for the submittal, approval, and tracking of change requests. These policies should be documented and made readily accessible to InRoads users.

2.3.1 Review Existing Preferences (if Applicable)

ProSoft has conducted a review of the existing InRoads 7.1 preferences. During meetings at ITD and in subsequent conversations, however, it was determined that with the differences in drawing types and level structures that will be included in the new CAD standards, existing preferences that have been used with InRoads 7.1 will be of little value toward the development of the new InRoads SelectCAD 8.2 preferences, which means that the creation of new preferences will essentially be a completely new development effort.

2.3.2 Determine List of Preferences for ITD Preference Files

The new Idaho Transportation CADD and design standards have been designed to address virtually all aspects of software use throughout the entire project life cycle and are intended to regulate the way CADD data is stored on project servers and unify the appearance of the documents that are included in plan sets. This will be accomplished through the development of a CADD standards database and InRoads preferences, named symbologies, and feature styles. While a significant development effort will be required to create preferences due to the extent to which the CADD and design standards have been developed, the end result will be something that will greatly enhance the use of InRoads at the Idaho Transportation Department.

In addition to the preferences and feature styles outlined above, feature codes will be developed for the InRoads Survey software. These codes will match the feature styles that are contained in the drawing type spreadsheets.

The table below contains a list of the preferences that will be developed.

InRoads Command	Preference Name	Comment
Alignment Annotation	cogo points	
Alignment Annotation	default	
Annotate Cross Section	default	
Annotate Feature	default	
Annotate Profile	default	
Annotate Vertical Alignment	For P&PG	
Closed Area	default	
Cogo Point Symbology	default	
Create Legend	default	
Cross Section Labels	default	
Cross Section Tracking	default	
Curve Set Annotation	default	
Default Superelevation Rate Parameters	default	
Default Superelevation Values	default	
Default Superelevation Vertical Control Values	default	
Display 3D Alignment	default	
Display Color Coded Directions	default	
Display Color Coded Elevations	default	
Display Color Coded Slopes	default	
Display Contours	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference

	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display DTM Data	default	
Display Features In Cross Sections	default	
Display Gridded Model	default	
Display Inferred Breaklines	default	
Display Inferred Breaklines	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display Perimeter	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display Point Elevation	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference

	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display Profiled Model	default	
Display Single Point Elevation	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display Single Slope Vector	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display Slope Vectors	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference

	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Display Stations	default	
	No Cardinals	
Display Triangles	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Edit Feature In Cross Section	default	
End Area Volume	default	
Export ASCII Data	default	
Feature Filter	All Features but SPOT	
	All Features but Exterior	
	Breaklines ONLY	
	Exterior ONLY	
	Hinges ONLY	
	Random Only	
Fillet Feature	default	
General Tracking	default	
Generate Gridded Model	Existing Ground	
Generate Longitudinal Feature	default	
Generate Slope Surface	default	
Generate Surface	default	
Generate Transverse Feature	default	
Import ASCII Data	breaklines w/features	
Import ASCII Data	breaklines w/o features	
Import ASCII Data	default	
Import ASCII Data	Random w/Feature Style	
Import Graphic Element	default	

Isopach	default	
Label Contours	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference
	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Merge Surfaces	default	
Plan Profile Generator	default	
Plan Profile Generator	Plan ONLY	
Plan Profile Generator	Profile ONLY	
Profile Along Alignment	For P&PG	Use with Plan & Profile Generator
Project Alignment To Profile	default	
Project Point To Profile	default	
Reporting Crossing Breaklines	default	
Roadway Modeler	default	
Roadway Modeler	intersection design	
Roadway Modeler	No Super	
Save .XYZ Data	default	
System Preferences	1"=10'	Changes Scale Factors only
	1"=20'	Changes Scale Factors only
	1"=40'	Changes Scale Factors only
	1"=50'	Changes Scale Factors only
	1"=100'	Changes Scale Factors only
	1"=200'	Changes Scale Factors only
	1"=400'	Changes Scale Factors only
	1"=500'	Changes Scale Factors only
	1"=1000'	Changes Scale Factors only
	1"=2000'	Changes Scale Factors only
	default	
	Max Precision	Sets All Precision Field Parameters to Maximum Units with Scale set to 1"=40'
Thin Surface	default	
Transform Surface	default	
Two Point Cross Sections	default	
Two Point Cross Sections	Typical	
Two Point Slope	1" Aggregate Type A For Base	Surface Preference
	1" Aggregate Type B For Base	Surface Preference
	1/2" Aggregate For Base	Surface Preference

	2" Aggregate For Base	Surface Preference
	3/4" Aggregate Type A For Base	Surface Preference
	3/4" Aggregate Type B For Base	Surface Preference
	3/8" Aggregate For Base	Surface Preference
	Cem Rec Asphalt Base Stab	Surface Preference
	default	Surface Preference
	Existing Ground	Surface Preference
	Finished Grade	Surface Preference
	Granular Subbase	Surface Preference
	Open-Graded Rock Base	Surface Preference
	Sub-Subgrade	Surface Preference
	Subgrade	Surface Preference
Vertical Change In Plan	default	
View Horizontal Regression Points	default	
View Vertical Regression Points	default	
XML reporting	default	
	Preferred Preference - default	**Not an InRoads Command**

The table below contains a list of approved geometry styles

Geometry Styles List
bearing_line
cogo_exist
cogo_prop
default
mainline_halign
mainline_valign
property_line
sideroad_halign
sideroad_valign
survline_halign
R/W_line_P
R/W_line_X

2.3.3 Compare Preference Settings to CADD Standards

InRoads preference settings and NetSPEX drawing components must currently be maintained as separate resources. It will, therefore, be necessary for these settings to be compared to verify that CADD standards resources will be synchronized between these two applications prior to their development. This task has been completed.

2.4.1 Named Symbologies

Named symbologies provide a new way in InRoads SelecCAD 8.2 to store commonly used symbology settings. They can be employed, for example, to define the color, style, and weight properties of feature styles that are used during the InRoads modeling process. A list of standard named symbologies that will be incorporated into the ITD design standards is included in the table under Task 2.4.2 below.

2.4.2 Named Symbology Properties and Drawing Types

As mentioned above, named symbologies are a key component of InRoads SelecCAD 8.2 in the sense that they are used to store commonly used color, style, and line weight properties. The table shown below lists the standard ITD named symbologies.

Named Symbology	Description
1" Aggregate Type A For Base	Surface Grade Line
1" Aggregate Type B For Base	Surface Grade Line
1/2" Aggregate For Base	Surface Grade Line
2" Aggregate For Base	Surface Grade Line
3/4" Aggregate Type A For Base	Surface Grade Line
3/4" Aggregate Type B For Base	Surface Grade Line
3/8" Aggregate For Base	Surface Grade Line
ANGPNT	Used to set symbology with InRoads tools
ANNO_ALIGN	Used to set symbology with InRoads tools
ANNO_ALIGN_ELEV	Used to set symbology with InRoads tools
ANNO_ALIGN_EQUATION	Used to set symbology with InRoads tools
ANNO_ALIGN_STATIONING	Used to set symbology with InRoads tools
ANNO_AXIS	Used to set symbology with InRoads tools
ANNO_GRID	Used to set symbology with InRoads tools
ANNO_GRID_MAJOR	Used to set symbology with InRoads tools
ANNO_GRID_MINOR	Used to set symbology with InRoads tools
ANNO_GRID_TEXT	Used to set symbology with InRoads tools
ANNO_LINEWORK	Used to set symbology with InRoads tools
ANNO_MATCHLINE	Used to set symbology with InRoads tools
ANNO_MISC	Used to set symbology with InRoads tools
ANNO_MISC_LC	Used to set symbology with InRoads tools
ANNO_MISC_RJ	Used to set symbology with InRoads tools
ANNO_PHOTOGRM	Used to set symbology with InRoads tools
ANNO_PROF	Used to set symbology with InRoads tools
ANNO_RAIL	Used to set symbology with InRoads tools
ANNO_STRUC	Used to set symbology with InRoads tools
ANNO_SURF	Used to set symbology with InRoads tools
ANNO_SURV	Used to set symbology with InRoads tools
ANNO_TEXT	Used to set symbology with InRoads tools
APP_X	Paved Approaches Existing
APPRPR_X	Paved Rural Approaches Existing
APPRRP_P	Paved Rural Approaches Proposed
APPRRU_P	Unpaved Rural Approaches Proposed
APPRUPR_X	Urban Approaches Proposed
APPRU_P	Urban Approaches Existing
APPR_X	Unpaved Rural Approaches Existing
ARCH_P	Pipe Arch Proposed
ATTEN_P	Attenuators Proposed
BAR4F_X	Found 1/2 in. Rebar
BAR4S_P	Set 1/2 in. Rebar
BAR5F_X	Found 5/8 in. Rebar

BAR5S_P	Set 5/8 in. Rebar
BCRB_X	Top Back of Curb Existing
BENMRK_X	Benchmarks
BOLLARD_P	Bollards Proposed
BOLLARD_X	Bollards Existing
BRCAP_X	Found Brass or Alloy Cap
BRGSYMB_P	Bridges Proposed
BRGSYMB_X	Bridges Existing
BSDWLK_X	Back of Sidewalk Existing
BUILD_P	Building Footprint Proposed
BUILD_X	Building Footprint Existing
BUSHB_X	Bush Boundary Existing
BUSH_X	Bush Existing
C&G_X	Curb & Gutter Existing
CATBN_P	Catch Basins Proposed
CATBN_X	Catch Basins Existing
CATTLE_P	Cattle Guard Proposed
CATTLE_X	Cattle Guard Existing
Cem Rec Asphalt Base Stab	Surface Grade Line
Centerline	Reserved InRoads point
CHANNEL_X	Channel Change Existing
CHNLCH_P	Channel Change Proposed
CL_B	Baseline Center Lines
CL_D	Designed Center Lines
CL_F	Finished Grade Center Lines
CL_S	Surveyed Center Lines
CL_SUB	Subgrade Center Lines
CONRAIL_P	Guardrail Concrete Proposed
CONTLINE_X	Surveyed Control Lines
CON_X	Misc. Flat Concrete Existing
CRAIL_X	Guardrail Concrete Existing
CULV_P	Culverts Proposed
CULV_X	Culverts Existing
CURB&GUT_P	Curb & Gutter Proposed
CURB_P	Curb Proposed
CURB_X	Curb Existing
CUT_P	Cut Slope Proposed
CUT_X	Cut Slope Existing
Default	Default Named Symbology
Ditch Backslope	Reserved InRoads point
Ditch Bottom	Reserved InRoads point
Ditch Foreslope	Reserved InRoads point
DLNTR_P	Delineator Proposed
DLNTR_X	Delineator Existing
DTCHBTM_P	Bottom of Ditch Proposed
DTCHBTM_X	Bottom of Ditch Existing
DTCHF/L_P	Flow Line of Ditch Proposed
DTCHF/L_X	Flow Line of Ditch Existing

DTCHTBS_P	Backslope of Ditch Proposed
DTCHTOP_P	Top of Ditch Proposed
DTCHTOP_X	Top of Ditch Existing
EASE_P	Easement Line Proposed
EASE_X	Easement Line Existing
EGUY_P	Electrical Pole Anchor Proposed
EGUY_X	Electrical Pole Anchor Existing
EJBX_P	Electrical Junction Box Proposed
EJBX_X	Electrical Junction Box Existing
ELINE_P	Electrical Cable Proposed
ELINE_X	Electrical Cable Existing
EMBNK_P	Embankment Protectors Proposed
EMBNK_X	Embankment Protectors Existing
EMTR_P	Electrical Meter Proposed
EMTR_X	Electric Meter Existing
EO_P	Edge of Oil Proposed
EO_X	Edge of Oil Existing
EPOLE_P	Electrical Pole Proposed
EPOLE_X	Electrical Pole Existing
ESPED_X	Electrical Service Pedestal Existing
ETWR_X	Transmission Tower Existing
EVENT	Used to set symbology with InRoads tools
Existing Ground	Surface Grade Line
F/LGTR_P	Flow Line of Gutter Proposed
F/LGTR_X	Flow line of Gutter Existing
FENCE_P	Fences Proposed
FENCE_X	Fences Existing
FHYD_P	Fire Hydrant Proposed
FHYD_X	Fire Hydrant Existing
FILL_P	Fill Slope Proposed
FILL_X	Fill Slope Existing
Finished Grade	Surface Grade Line
FLAG_P	Flagpoles Proposed
FLAG_X	Flagpoles Existing
FOJBX_P	Fiber Optic Junction Box Proposed
FOJBX_X	Fiber Optic Junction Box Existing
FOLINE_P	Fiber Optic Cable Proposed
FOLINE_X	Fiber Optic Cable Existing
FORREST_X	Forrest Boundary Lines Existing
FOTWR_P	Fiber Optic Transmission Tower Proposed
FOTWR_X	Transmission Tower Existing
FOUND_P	Foundations Proposed
FOUND_X	Foundations Existing
GATE_P	Gates Proposed
GATE_X	Gates Existing
GLINE_P	Gas Pipe Proposed
GLINE_X	Gas Pipe Existing
GMTR_P	Gas Meter Proposed

GMTR_X	Gas Meter Existing
GPMP_P	Gas Pump Proposed
GPMP_X	Gas Pump Existing
GPS_X	GPS Control Points Existing
Granular Subbase	Surface Grade Line
GRSR_P	Gas Riser Proposed
GRSR_X	Gas Riser Existing
GUTTER_P	Gutter Proposed
GUTTER_X	Gutter Existing
GVLV_P	Gas Valve Proposed
GVLV_X	Gas Valve Existing
HDGATE_X	Headgate Existing
HDWL_P	Headwalls Proposed
HDWL_X	Headwalls Existing
Hinge	Reserved InRoads point
HINGE_B	Hinge Base Line
HINGE_F	Hinge Finish Grade Line
HINGE_S	Hinge Subgrade Lines
ILCOM_P	Illumination Composite Junction Box Proposed
ILCOM_X	Illumination Composite Junction Box Existing
ILCOND_P	Illumination Concrete Junction Box Proposed
ILCOND_X	Illumination Concrete Junction Box Existing
ILCON_P	Illumination Conduit Proposed
ILCON_X	Illumination Conduit Existing
ILPOL_P	Pole Proposed
ILPOL_X	Pole Existing
INLET_P	Inlets Proposed
INLET_X	Inlets Existing
Interior Boundary	Default Interior Points
IRHDWL_P	Irrigation Headwalls Proposed
IRHDWL_X	Irrigation Headwalls Existing
IRMHL_P	Irrigation Manhole Proposed
IRMHL_X	Irrigation Manhole Existing
IRPIPEF_X	Found Iron Pipe Existing
IRPIPES_P	Set Iron Pipe Proposed
IRPIPE_P	Irrigation Pipe Proposed
IRPIPE_X	Irrigation Pipe Existing
IRPMP_P	Irrigation Pumps Proposed
IRPMP_X	Irrigation Pumps Existing
IRRBOX_X	Irrigation Box Existing
IRRSR_P	Irrigation Risers Proposed
IRSIPH_P	Irrigation Siphons Proposed
IRSIPH_X	Irrigation Siphons Existing
IRSTR_P	Irrigation Minor Structures Proposed
IRSTR_X	Irrigation Minor Structures Existing
IRVLV_P	Irrigation Valves Proposed
IRVLV_X	Irrigation Valves Existing
LANELINE_X	Lane Lines Existing

LIPGUT_P	Lip of Gutter Proposed
LPOLE_P	Luminaire Pole Proposed
LPOLE_X	Luminaire Pole Existing
MAIL_P	Mail Box Proposed
MARSHB_P	Marshland Boundary Proposed
MARSHB_X	Marshland Boundary Existing
MAST_X	Mast Arm Existing
MBOX_X	Mail Box Existing
MEDBAR_P	Median Barriers Proposed
METRAIL_P	Guardrail Metal Proposed
MRAIL_X	Guardrail Metal Existing
NDRAIN_X	Natural Drainage Existing
NWALL_P	Noise Walls Proposed
NWALL_X	Noise Walls Existing
OLINE_P	Oil Pipe Proposed
OLINE_X	Oil Pipe Existing
OPASS_P	Overpass Proposed
OPASS_X	Overpass Existing
Open-Graded Rock Base (Rock Cap)	Surface Grade Line
ORSR_P	Oil Riser Proposed
ORSR_X	Oil Riser Existing
OVLV_P	Oil Valve Proposed
OVLV_X	Oil Valve Existing
P/L_X	Property-Subdivision-Lot-Block & etc. Lines Existing
P/LFEN_X	Property Subdivision Lot Block & etc. Lines w/Fence Existing
PAD_P	Pads Proposed
PAD_X	Pads Existing
PARKING_P	Parking Lots Proposed
PATH_X	Paths Existing
PCPNT	Used to set symbology with InRoads tools
PHONE_X	Telephone Booth Existing
PHOTO_X	Photo Center Existing
PIER_P	Piers Proposed
PIER_X	Piers Existing
PIPEB_P	Pipe with Bell Proposed
PIPEB_X	Pipe with Bell Existing
PIPE_P	Pipe Without Bell Proposed
PIPE_X	Pipe Without Bell Existing
PREMK_X	Premarks Existing
PROFILE	Used to set symbology with InRoads tools
PROF_ANGPNT	Used to set symbology with InRoads tools
R/W-P	R/W Proposed
R/W_X	R/W Existing
RAILCON_P	Concrete Guardrail Proposed
RAILMET_P	Metal Guardrail Proposed
RDPAV_P	Edge of Paved Road Proposed
RDUNPAV_P	Edge of Unpaved Road Proposed
RDWY_ANGPNT	Used to set symbology with InRoads tools

RDWY_HALIGN	Used to set symbology with InRoads tools
RIPRAP_P	Riprap Proposed
RIPRAP_X	Riprap Existing
RIVER_X	River Existing
RR1_P	Railroad 1 Track Proposed
RR1_X	Railroad 1 Track Existing
RR2_P	Railroad 2 Track Proposed
RR2_X	Railroad 2 Track Existing
RRDEV_X	Railroad Protective Devices Existing
RRLIT_X	Railroad Signal Light Existing
RRSPC_X	Railroad Signal Preemption Conduit Existing
RRSW_X	Railroad Switch Existing
RRX_P	Railroad Crossing Proposed
RSVD_1	Used to set symbology with InRoads tools
RSVD_2	Used to set symbology with InRoads tools
RSVD_3	Used to set symbology with InRoads tools
RSVD_NOTES	Used to set symbology with InRoads tools
RWALL_P	Retaining Walls Proposed
RWALL_X	Retaining Walls Existing
RWM_X	R/W Markers Existing
SBRASS_P	Set Brass or Alloy Cap Proposed
SC_P	Signal Conduit Proposed
SC_X	Signal Conduit Existing
SCBSP_X	Signal Controller Cabinet & Electrical Service Pedestal Existing
SCCAB_X	Signal Controller Cabinet Existing
SCOMB_X	Signal Composite Junction Box Existing
SCONB_X	Signal Concrete Junction Box Existing
SDWALK_X	Sidewalk Existing
SDWLK_P	Sidewalks Proposed
SEG1_B	Segment 1 Base Line
SEG1_F	Segment 1 Finished Grade Line
SEG1_S	Segment 1 Subgrade Line
SEG2_B	Segment 2 Base Line
SEG2_F	Segment 2 Finished Grade Line
SEG2_S	Segment 2 Subgrade Line
SEG3_B	Segment 3 Base Line
SEG3_F	Segment 3 Finished Grade Line
SEG3_S	Segment 3 Subgrade Line
SEG4_B	Segment 4 Base Line
SEG4_F	Segment 4 Finished Grade Line
SEG4_S	Segment 4 Subgrade Line
SEG5_B	Segment 5 Base Line
SEG5_F	Segment 5 Finished Grade Line
SEG5_S	Segment 5 Subgrade Line
SEG6_B	Segment 6 Base Line
SEG6_F	Segment 6 Finished Grade Line
SEG6_S	Segment 6 Subgrade Line
SEG7_B	Segment 7 Base Line

SEG7_F	Segment 7 Finished Grade Line
SEG7_S	Segment 7 Subgrade Line
SEG8_B	Segment 8 Base Line
SEG8_F	Segment 8 Finished Grade Line
SEG8_S	Segment 8 Subgrade Line
SEG9_B	Segment 9 Base Line
SEG9_F	Segment 9 Finished Grade Line
SEG9_S	Segment 9 Subgrade Line
SEG10_B	Segment 10 Base Line
SEG10_F	Segment 10 Finished Grade Line
SEG10_S	Segment 10 Subgrade Line
SHLDR_X	Shoulder Existing
Shoulder	Reserved InRoads point
SIGN1_X	Sign - 1 Post Existing
SIGN2_X	Sign - 2 Post Existing
SINTB_X	Signal Interconnect Junction Box Existing
SINTC_X	Signal Interconnect Conduit Existing
SIPHON_P	Pipe Siphon Proposed
SIPHON_X	Pipe Siphon Existing
SLCULV_P	Stiff-Leg Box Culverts Proposed
SNLINE_P	Sanitary Sewer Pipe Proposed
SNLINE_X	Sanitary Sewer Pipe Existing
SNMHL_P	Sanitary Sewer Manhole Proposed
SNMHL_X	Sanitary Sewer Manhole Existing
SNOWFEN_P	Snow Fence Proposed
SNOWFEN_X	Snow Fence Existing
SPDITCH_P	Special Ditches Proposed
SPDITCH_X	Special Ditches Existing
SPED1_X	Pedestrian Head 1 Existing
SPED2_X	Pedestrian Head 2 Existing
SPOLE_P	Pole Proposed
SPOLE_X	Pole Existing
SPOT	Spot Elevations
SPPAVE_X	Special Pavement Markings Existing
SPR_X	Sprinkler Existing
SRCAB_X	Signal Railroad Cab Existing
SSLINE_P	Storm Sewer Lines Proposed
SSLINE_X	Storm Sewer Lines Existing
SSMHL_P	Storm Sewer Manholes Proposed
SSMHL_X	Storm Sewer Manholes Existing
STOCK_P	Stockpass Proposed
STONE_X	Found Stone Existing
STOPBAR_X	Stop Bar Existing
STUMP_X	Stump Existing
Sub-Subgrade	Surface Grade Line
Subgrade	Surface Grade Line
SVEH5_X	Signal Head 5 Section Cluster (doghouse) Existing
SVEHV_X	Signal Head-Vertical 3 4 5 Section Existing

TANK_X	Tanks Existing
TBCURB_P	Top Back of Curb Proposed
TCRB_X	Top of Curb Existing
TEMP	Temp Point - For Use w/Decision Tables
TFCURB_P	Top Face of Curb Proposed
TGUY_P	Telephone Pole Anchor Proposed
TGUY_X	Pole Anchor Existing
TJBX_P	Telephone Junction Box Proposed
TJBX_X	Telephone Junction Box Existing
TLINE_P	Telephone Cable Proposed
TLINE_X	Telephone Cable Existing
TOE_X	Toe of Slope Existing
TPOLE_P	Telephone Pole Proposed
TPOLE_X	Telephone Pole Existing
TRAIL_P	Misc. Paths & Trails Proposed
TRAIL_X	Misc. Paths & Trails Existing
TREEB_P	Tree Proposed
TREEB_X	Tree Existing
TREE_P	Tree Boundary Proposed
TREE_X	Tree Boundary Existing
TRRPM	Temporary Ridged Raised Pavement Markers
TTWR_P	Transmission Tower Proposed
TTWR_X	Transmission Tower Existing
UDRAIN_P	Underdrains Proposed
UDRAIN_X	Underdrains Existing
Uncontrolled	Reserved InRoads point
UPASS_P	Underpass Proposed
UPASS_X	Underpass Existing
WATRFTR_X	Water Features Existing
WELL_P	Well Proposed
WELL_X	Well Existing
WETLANDB_P	Wetland Boundary Proposed
WETLANDB_X	Wetland Boundary Existing
WETLAND_P	Wetland Proposed
WETLAND_X	Wetland Existing
WLINE_P	Water Pipe Proposed
WLINE_X	Water Pipe Existing
WMTR_P	Water Meter Proposed
WMTR_X	Water Meter Existing
WRSR_P	Water Riser Proposed
WRSR_X	Water Riser Existing
WVLV_P	Water Valve Proposed
WVLV_X	Water Valve Existing
XWALK_X	Crosswalk Existing

2.5.1 Existing Feature Codes

The existing feature codes have been examined. ITD has elected to coordinate feature codes with transition control names to provide uniform naming conventions throughout the entire design process. This is a practice that should be maintained.

2.5.2 Additional Feature Code Development

The feature codes that have been developed and that continue to be used at ITD are extensive and complete. The need to develop additional feature codes for the initial release of the ITD CADD and design standards is not anticipated at this point. However, after implementation, this should be examined on a regular basis to determine whether or not the addition of new feature codes is warranted.

2.6.1 Feature Styles

InRoads feature styles provide unique functionality to determine where features can be displayed (i.e., plan views, profile views, or both). These controls are set in an interface component called the Feature Style Manager. A series of display toggles control how and what gets displayed for each feature style. The appearance of the graphics that are generated by feature styles is controlled through the use of named symbologies.

A list of standard feature styles that will be incorporated into the ITD design standards is shown in the table included under Task 2.6.2 below.

2.6.2 Display Properties for Feature Styles

The ITD standard feature styles, along with their named symbologies, are shown in the table below.

Feature Style	Description	Named Symbology
ABUT_P	Abutments Proposed	BRGSYMB_P
ABUT_X	Abutments Existing	BRIDGE_X
APPRPR_X	Paved Rural Approaches Existing	APPRPR_X
APPRRP_P	Paved Rural Approaches Proposed	APPRRP_P
APPRRU_P	Unpaved Rural Approaches Proposed	APPRRU_P
APPRU_P	Urban Approaches Proposed	APPRU_P
APPRU_X	Urban Approaches Existing	APPR_X
APPRUPR_X	Unpaved Rural Approaches Existing	APPRUPR_X
ARCH_P	Pipe Arch Proposed	ARCH_P
ATTEN_P	Attenuators Proposed	ATTEN_P
BAR4F_X	Found 1/2 in. Rebar	BAR4F_X
BAR4S_P	Set 1/2 in. Rebar	BAR4S_P
BAR5F_X	Found 5/8 in. Rebar	BAR5F_X
BAR5S_P	Set 5/8 in. Rebar	BAR5S_P
BCRB_X	Top Back of Curb Existing	BCRB_X
BCULV_P	Box Culverts Proposed	BRGSYMB_P
Bench	Reserved InRoads point	Default
BENMRK_X	Benchmarks	BENMRK_X
BOLLARD_P	Bollards Proposed	BOLLARD_P
BOLLARD_X	Bollards Existing	BOLLARD_X

BRCAP_X	Found Brass or Alloy Cap	BRCAP_X
Breaklines	Default Breakline Points	Default
BRIDGE_P	Bridges Proposed	BRGSYMB_P
BRIDGE_X	Bridges Existing	BRGSYMB_X
BRK_X	Breaklines Existing	Default
BSDWLK_X	Back of Sidewalk Existing	BSDWLK_X
BUILD_P	Building Footprint Proposed	BUILD_P
BUILD_X	Building Footprint Existing	BUILD_X
BUSH_X	Bush Existing	BUSH_X
BUSHB_X	Bush Boundary Existing	BUSHB_X
C&G_X	Curb & Gutter Existing	C&G_X
C/L_S	Surveyed Center Line	CL_S
CATBN_P	Catch Basins Proposed	CATBN_P
CATBN_X	Catch Basins Existing	CATBN_X
CATTLE_P	Cattle Guard Proposed	CATTLE_P
CATTLE_X	Cattle Guard Existing	CATTLE_X
Centerline	Reserved InRoads point	Centerline
CHANNEL_X	Channel Change Existing	CHANNEL_X
CHNLCH_P	Channel Change Proposed	CHNLCH_P
CL_B	Baseline Center Lines	CL_B
CL_D	Designed Center Lines	CL_D
CL_F	Finished Grade Center Lines	CL_F
CL_S	Surveyed Center Lines	CL_S
CL_SUB	Subgrade Center Lines	CL_SUB
CON_X	Misc. Flat Concrete Existing	CON_X
CONCRETE_P	Misc. Flat Concrete	SDWLK_P
CONRAIL_P	Temporary Barriers Proposed	CONRAIL_P
CONTLINE_X	Surveyed Control Lines	CONTLINE_X
Contours	Reserved InRoads point	Default
CRAIL_X	Guardrail Concrete Existing	CRAIL_X
CULVERT_P	Culverts Proposed	CULV_P
CULVERT_X	Culverts Existing	CULV_X
CURB&GUT_P	Curb & Gutter Proposed	CURB&GUT_P
CURB_P	Curb Proposed	CURB_P
CURB_X	Curb Existing	CURB_X
CUT_P	Cut Slope Proposed	CUT_P
CUT_X	Cut Slope Existing	CUT_X
Default	Default Feature Style	Default
Ditch Backslope	Reserved InRoads point	DITCH_P
Ditch Bottom	Reserved InRoads point	DTCHBTM_P
Ditch Foreslope	Reserved InRoads point	DITCH_P
DLNTR_P	Delineator Proposed	DLNTR_P
DLNTR_X	Delineator Existing	DLNTR_X
DTCHBTM_P	Bottom of Ditch Proposed	DTCHBTM_P
DTCHBTM_X	Bottom of Ditch Existing	DTCHBTM_X
DTCHF/L_P	Flow Line of Ditch Proposed	DTCHF/L_P
DTCHF/L_X	Flow Line of Ditch Existing	DTCHF/L_X
DTCHTBS_P	Backslope of Ditch Proposed	DTCHTBS_P

DTCHTOP_P	Top of Ditch Proposed	DTCHTOP_P
DTCHTOP_X	Top of Ditch Existing	DTCHTOP_X
EASE_P	Easement Line Proposed	EASE_P
EASE_X	Easement Line Existing	EASE_X
EGUY_P	Electrical Pole Anchor Proposed	EGUY_P
EGUY_X	Electrical Pole Anchor Existing	EGUY_X
EJBX_P	Electrical Junction Box Proposed	EJBX_P
EJBX_X	Electrical Junction Box Existing	EJBX_X
ELINE_P	Electrical Cable Proposed	ELINE_P
ELINE_X	Electrical Cable Existing	ELINE_X
EMBNK_P	Embankment Protectors Proposed	EMBNK_P
EMBNK_X	Embankment Protectors Existing	EMBNK_X
EMTR_P	Electrical Meter Proposed	EMTR_P
EMTR_X	Electric Meter Existing	EMTR_X
EO_P	Edge of Oil Proposed	EO_P
EO_X	Edge of Oil Existing	EO_X
EPOLE_P	Electrical Pole Proposed	EPOLE_P
EPOLE_X	Electrical Pole Existing	EPOLE_X
ESPED_X	Electrical Service Pedestal Existing	ESPED_X
ETWR_X	Transmission Tower Existing	ETWR_X
Exterior Boundary	Reserved InRoads Points	Exterior
F/LGTR_P	Flow Line of Gutter Proposed	F/LGTR_P
F/LGTR_X	Flow line of Gutter Existing	F/LGTR_X
FENCE_P	Fences Proposed	FENCE_P
FENCE_X	Fences Existing	FENCE_X
FHYD_P	Fire Hydrant Proposed	FHYD_P
FHYD_X	Fire Hydrant Existing	FHYD_X
FILL_P	Fill Slope Proposed	FILL_P
FILL_X	Fill Slope Existing	FILL_X
FLAG_P	Flagpoles Proposed	FLAG_P
FLAG_X	Flagpoles Existing	FLAG_X
FOJBX_P	Fiber Optic Junction Box Proposed	FOJBX_P
FOJBX_X	Fiber Optic Junction Box Existing	FOJBX_X
FOLINE_P	Fiber Optic Cable Proposed	FOLINE_P
FOLINE_X	Fiber Optic Cable Existing	FOLINE_X
FORREST_X	Forrest Boundary Lines Existing	FORREST_X
FOTWR_P	Fiber Optic Transmission Tower Proposed	FOTWR_P
FOTWR_X	Transmission Tower Existing	FOTWR_X
FOUND_P	Foundations Proposed	FOUND_P
FOUND_X	Foundations Existing	FOUND_X
GATE_P	Gates Proposed	GATE_P
GATE_X	Gates Existing	GATE_X
GLINE_P	Gas Pipe Proposed	GLINE_P
GLINE_X	Gas Pipe Existing	GLINE_X
GMTR_P	Gas Meter Proposed	GMTR_P
GMTR_X	Gas Meter Existing	GMTR_X
GPMP_P	Gas Pump Proposed	GPMP_P
GPMP_X	Gas Pump Existing	GPMP_X

GPS_X	GPS Control Points Existing	GPS_X
GRSR_P	Gas Riser Proposed	GRSR_P
GRSR_X	Gas Riser Existing	GRSR_X
GUTTER_P	Gutter Proposed	GUTTER_P
GUTTER_X	Gutter Existing	GUTTER_X
GVLV_P	Gas Valve Proposed	GVLV_P
GVLV_X	Gas Valve Existing	GVLV_X
HDGATE_X	Headgate Existing	HDGATE_X
HDWL_P	Headwalls Proposed	HDWL_P
HDWL_X	Headwalls Existing	HDWL_X
Hinge	Reserved InRoads point	Hinge
HINGE_B	Hinge Base Line	HINGE_B
HINGE_F	Hinge Finish Grade Line	HINGE_F
HINGE_S	Hinge Subgrade Lines	HINGE_S
ILCOM_P	Illumination Composite Junction Box Proposed	ILCOM_P
ILCOM_X	Illumination Composite Junction Box Existing	ILCOM_X
ILCON_P	Illumination Concrete Junction Box Proposed	ILCON_P
ILCON_X	Illumination Concrete Junction Box Existing	ILCON_X
ILCOND_P	Illumination Conduit Proposed	ILCOND_P
ILCOND_X	Illumination Conduit Existing	ILCOND_X
ILPOL_P	Illumination Pole Proposed	ILPOL_P
ILPOL_X	Illumination Pole Existing	ILPOL_X
INLET_P	Inlets Proposed	INLET_P
INLET_X	Inlets Existing	INLET_X
Interior	Default Interior Points	Interior
IRHDWL_P	Irrigation Headwalls Proposed	IRHDWL_P
IRHDWL_X	Irrigation Headwalls Existing	IRHDWL_X
IRMHL_P	Irrigation Manhole Proposed	IRMHL_P
IRMHL_X	Irrigation Pipe Manhole Existing	IRMHL_X
IRPIPE_P	Irrigation Pipe Proposed	IRPIPE_P
IRPIPE_X	Irrigation Pipe Existing	IRPIPE_X
IRPIPEF_X	Found Iron Pipe Existing	IRPIPEF_X
IRPIPES_P	Set Iron Pipe Proposed	IRPIPES_P
IRPMP_P	Irrigation Pumps Proposed	IRPMP_P
IRPMP_X	Irrigation Pumps Existing	IRPMP_X
IRRBOX_X	Irrigation Box Existing	IRRBOX_X
IRRSR_P	Irrigation Risers Proposed	IRRSR_P
IRSIPH_P	Irrigation Siphons Proposed	IRSIPH_P
IRSIPH_X	Irrigation Siphons Existing	IRSIPH_X
IRSTR_P	Irrigation Minor Structures Proposed	IRSTR_P
IRSTR_X	Irrigation Minor Structures Existing	IRSTR_X
IRVLV_P	Irrigation Valves Proposed	IRVLV_P
IRVLV_X	Irrigation Valves Existing	IRVLV_X
L1_B	Left Segment 1 Base Line	SEG1_B
L1_F	Left Segment 1 Finished Grade Line	SEG1_F
L1_S	Left Segment 1 Subgrade Line	SEG1_S
L10_B	Left Segment 10 Base Line	SEG10_B
L10_F	Left Segment 10 Finished Grade Line	SEG10_F

L10_S	Left Segment 10 Subgrade Line	SEG10_S
L2_B	Left Segment 2 Base Line	SEG2_B
L2_F	Left Segment 2 Finished Grade Line	SEG2_F
L2_S	Left Segment 2 Subgrade Line	SEG2_S
L3_B	Left Segment 3 Base Line	SEG3_B
L3_F	Left Segment 3 Finished Grade Line	SEG3_F
L3_S	Left Segment 3 Subgrade Line	SEG3_S
L4_B	Left Segment 4 Base Line	SEG4_B
L4_F	Left Segment 4 Finished Grade Line	SEG4_F
L4_S	Left Segment 4 Subgrade Line	SEG4_S
L5_B	Left Segment 5 Base Line	SEG5_B
L5_F	Left Segment 5 Finished Grade Line	SEG5_F
L5_S	Left Segment 5 Subgrade Line	SEG5_S
L6_B	Left Segment 6 Base Line	SEG6_B
L6_F	Left Segment 6 Finished Grade Line	SEG6_F
L6_S	Left Segment 6 Subgrade Line	SEG6_S
L7_B	Left Segment 7 Base Line	SEG7_B
L7_F	Left Segment 7 Finished Grade Line	SEG7_F
L7_S	Left Segment 7 Subgrade Line	SEG7_S
L8_B	Left Segment 8 Base Line	SEG8_B
L8_F	Left Segment 8 Finished Grade Line	SEG8_F
L8_S	Left Segment 8 Subgrade Line	SEG8_S
L9_B	Left Segment 9 Base Line	SEG9_B
L9_F	Left Segment 9 Finished Grade Line	SEG9_F
L9_S	Left Segment 9 Subgrade Line	SEG9_S
LANELINE_X	Lane Lines Existing	LANELINE_X
LGTR_X	Lip of Gutter Existing	F/LGTR_X
LIPGUT_P	Lip of Gutter Proposed	LIPGUT_P
LPOLE_P	Luminaire Pole Proposed	LPOLE_P
LPOLE_X	Luminaire Pole Existing	LPOLE_X
MAIL_P	Mail Box Proposed	MAIL_P
MARSHB_P	Marshland Boundary Proposed	MARSHB_P
MARSHB_X	Marshland Boundary Existing	MARSHB_X
MAST_X	Mast Arm Existing	MAST_X
MBOX_X	Mail Box Existing	MBOX_X
MEDBAR_P	Median Barriers Proposed	MEDBAR_P
METRAIL_P	Guardrail Metal Proposed	METRAIL_P
MRAIL_X	Guardrail Metal Existing	MRAIL_X
NDRAIN_X	Natural Drainage Existing	NDRAIN_X
NWALL_P	Noise Walls Proposed	NWALL_P
NWALL_X	Noise Walls Existing	NWALL_X
OLINE_P	Oil Pipe Proposed	OLINE_P
OLINE_X	Oil Pipe Existing	OLINE_X
OPASS_P	Overpass Proposed	OPASS_P
OPASS_X	Overpass Existing	BRIDGE_X
ORSR_P	Oil Riser Proposed	ORSR_P
ORSR_X	Oil Riser Existing	ORSR_X
OVLV_P	Oil Valve Proposed	OVLV_P

OVLV_X	Oil Valve Existing	OVLV_X
P/L_X	Property-Subdivision-Lot-Block & etc. Lines Existing	P/L_X
P/LFEN_X	Property Subdivision Lot Block & etc. Lines w/Fence Existing	P/LFEN_X
PAD_P	Pads Proposed	PAD_P
PAD_X	Pads Existing	PAD_X
PARKING_P	Parking Lots Proposed	PARKING_P
PARKING_X	Parking Lots Existing	APP_X
PATH_X	Paths Existing	PATH_X
PHONE_X	Telephone Booth Existing	PHONE_X
PHOTO_X	Photo Center Existing	PHOTO_X
PIER_P	Piers Proposed	PIER_P
PIER_X	Piers Existing	PIER_X
PIPE_P	Pipe Proposed	PIPE_P
PIPE_X	Pipe Without Bell Existing	PIPE_X
PIPEB_P	Pipe with Bell Proposed	PIPEB_P
PIPEB_X	Pipe with Bell Existing	PIPEB_X
PREMK_X	Premarks Existing	PREMK_X
PWRS_P	Power Source Proposed	EPOLE_P
PWRS_X	Power Source Existing	EPOLE_X
R/W_P	R/W Proposed	R/W-P
R/W_X	R/W Existing	R/W_X
R1_B	Right Segment 1 Base Line	SEG1_B
R1_F	Right Segment 1 Finished Grade Line	SEG1_F
R1_S	Right Segment 1 Subgrade Line	SEG1_S
R10_B	Right Segment 10 Base Line	SEG10_B
R10_F	Right Segment 10 Finished Grade Line	SEG10_F
R10_S	Right Segment 10 Subgrade Line	SEG10_S
R2_B	Right Segment 2 Base Line	SEG2_B
R2_F	Right Segment 2 Finished Grade Line	SEG2_F
R2_S	Right Segment 2 Subgrade Line	SEG2_S
R3_B	Right Segment 3 Base Line	SEG3_B
R3_F	Right Segment 3 Finished Grade Line	SEG3_F
R3_S	Right Segment 3 Subgrade Line	SEG3_S
R4_B	Right Segment 4 Base Line	SEG4_B
R4_F	Right Segment 4 Finished Grade Line	SEG4_F
R4_S	Right Segment 4 Subgrade Line	SEG4_S
R5_B	Right Segment 5 Base Line	SEG5_B
R5_F	Right Segment 5 Finished Grade Line	SEG5_F
R5_S	Right Segment 5 Subgrade Line	SEG5_S
R6_B	Right Segment 6 Base Line	SEG6_B
R6_F	Right Segment 6 Finished Grade Line	SEG6_F
R6_S	Right Segment 6 Subgrade Line	SEG6_S
R7_B	Right Segment 7 Base Line	SEG7_B
R7_F	Right Segment 7 Finished Grade Line	SEG7_F
R7_S	Right Segment 7 Subgrade Line	SEG7_S
R8_B	Right Segment 8 Base Line	SEG8_B
R8_F	Right Segment 8 Finished Grade Line	SEG8_F

R8_S	Right Segment 8 Subgrade Line	SEG8_S
R9_B	Right Segment 9 Base Line	SEG9_B
R9_F	Right Segment 9 Finished Grade Line	SEG9_F
R9_S	Right Segment 9 Subgrade Line	SEG9_S
RAILCON_P	Concrete Guardrail Proposed	RAILCON_P
RAILMET_P	Metal Guardrail Proposed	RAILMET_P
Random	Default Random Points	Default
RDPAV_P	Edge of Paved Road Proposed	RDPAV_P
RDUNPAV_P	Edge of Unpaved Road Proposed	RDUNPAV_P
RIPRAP_P	Riprap Proposed	RIPRAP_P
RIPRAP_X	Riprap Existing	RIPRAP_X
RIVER_X	River Existing	RIVER_X
RR1_P	Railroad 1 Track Proposed	RR1_P
RR1_X	Railroad 1 Track Existing	RR1_X
RR2_P	Railroad 2 Track Proposed	RR2_P
RR2_X	Railroad 2 Track Existing	RR2_X
RRDEV_X	Railroad Protective Devices Existing	RRDEV_X
RRLIT_X	Railroad Signal Light Existing	RRLIT_X
RRSPC_X	Railroad Signal Preemption Conduit Existing	RRSPC_X
RRSW_X	Railroad Switch Existing	RRSW_X
RRX_P	Railroad Crossing Proposed	RRX_P
RWALL_P	Retaining Walls Proposed	RWALL_P
RWALL_X	Retaining Walls Existing	RWALL_X
RWM_X	R/W Markers Existing	RWM_X
SBRASS_P	Set Brass or Alloy Cap Proposed	SBRASS_P
SC_P	Signal Conduit Proposed	SC_P
SC_X	Signal Conduit Existing	SC_X
SCBSP_X	Signal Controller Cabinet & Electrical Service Pedestal Existing	SCBSP_X
SCCAB_X	Signal Controller Cabinet Existing	SCCAB_X
SCOMB_X	Signal Composite Junction Box Existing	SCOMB_X
SCONB_X	Signal Concrete Junction Box Existing	SCONB_X
SDWALK_X	Sidewalk Existing	SDWALK_X
SDWLK_P	Sidewalks Proposed	SDWLK_P
SHLDR_X	Shoulder Existing	SHLDR_X
Shoulder	Reserved InRoads point	Shoulder
SIGN1_X	1 Post Existing	SIGN1_X
SIGN2_X	2 Post Existing	SIGN2_X
SINTB_X	Signal Interconnect Junction Box Existing	SINTB_X
SINTC_X	Signal Interconnect Conduit Existing	SINTC_X
SIPHON_P	Pipe Siphon Proposed	SIPHON_P
SIPHON_X	Pipe Siphon Existing	SIPHON_X
SLCULV_P	Stiff-Leg Box Culverts Proposed	SLCULV_P
SNLINE_P	Sanitary Sewer Pipe Proposed	SNLINE_P
SNLINE_X	Sanitary Sewer Pipe Existing	SNLINE_X
SNMHL_P	Sanitary Sewer Manhole Proposed	SNMHL_P
SNMHL_X	Sanitary Sewer Manhole Existing	SNMHL_X
SNOWFEN_P	Snow Fence Proposed	SNOWFEN_P

SNOWFEN_X	Snow Fence Existing	SNOWFEN_X
SPDITCH_P	Special Ditches Proposed	SPDITCH_P
SPDITCH_X	Special Ditches Existing	SPDITCH_X
SPED1_X	Pedestrian Head 1 Existing	SPED1_X
SPED2_X	Pedestrian Head 2 Existing	SPED2_X
SPOLE_P	Pole Proposed	SPOLE_P
SPOLE_X	Pole Existing	SPOLE_X
SPOT	Spot Elevations	SPOT
SPPAVE_X	Special Pavement Markings Existing	SPPAVE_X
SPR_X	Sprinkler Existing	SPR_X
SRCAB_X	Signal Railroad Cab Existing	SRCAB_X
SSLINE_P	Storm Sewer Lines Proposed	SSLINE_P
SSLINE_X	Storm Sewer Lines Existing	SSLINE_X
SSMHL_P	Storm Sewer Manholes Proposed	SSMHL_P
SSMHL_X	Storm Sewer Manholes Existing	SSMHL_X
STOCK_P	Stockpass Proposed	STOCK_P
STONE_X	Found Set Stone Existing	STONE_X
STOPBAR_X	Stop Bar Existing	STOPBAR_X
STUMP_X	Stump Existing	STUMP_X
Superelevation 1	Reserved InRoads Point	Default
Superelevation 2	Reserved InRoads Point	Default
SVEH5_X	Signal Head 5 Section Cluster (doghouse) Existing	SVEH5_X
SVEHV_X	Signal Head-Vertical 3 4 5 Section Existing	SVEHV_X
SWBACK_P	Back of Sidewalk Proposed	SDWLK_P
TANK_X	Tanks Existing	TANK_X
TBCURB_P	Top Back of Curb Proposed	TBCURB_P
TCRB_X	Top of Curb Existing	TCRB_X
TEMP	Temp Point - For Use w/Decision Tables	TEMP
TFCURB_P	Top Face of Curb Proposed	TFCURB_P
TGUY_P	Telephone Pole Anchor Proposed	TGUY_P
TGUY_X	Pole Anchor Existing	TGUY_X
TJBX_P	Telephone Junction Box Proposed	TJBX_P
TJBX_X	Telephone Junction Box Existing	TJBX_X
TLINE_P	Telephone Cable Proposed	TLINE_P
TLINE_X	Telephone Cable Existing	TLINE_X
TOE_X	Toe of Slope Existing	TOE_X
TPOLE_P	Telephone Pole Proposed	TPOLE_P
TPOLE_X	Telephone Pole Existing	TPOLE_X
TRAIL_P	Misc. Paths & Trails Proposed	TRAIL_P
TRAIL_X	Misc. Paths & Trails Existing	TRAIL_X
TREE_P	Tree Proposed	TREE_P
TREE_X	Tree Existing	TREE_X
TREEB_P	Tree Boundary Proposed	TREEB_P
TREEB_X	Tree Boundary Existing	TREEB_X
TRRPM	Temporary Ridged Raised Pavement Markers	TRRPM
TTWR_P	Transmission Tower Proposed	TTWR_P
TTWR_X	Transmission Tower Existing	TTWR_X
UDRAIN_P	Underdrains Proposed	UDRAIN_P

UDRAIN_X	Underdrains Existing	UDRAIN_X
Uncontrolled	Reserved InRoads point	Uncontrolled
UPASS_P	Underpass Proposed	UPASS_P
UPASS_X	Underpass Existing	UPASS_X
WATRFTR_X	Water Features Existing	WATRFTR_X
WELL_P	Well Proposed	WELL_P
WELL_X	Well Existing	WELL_X
WETLAND_P	Wetland Proposed	WETLAND_P
WETLAND_X	Wetland Existing	WETLAND_X
WETLANDB_P	Wetland Boundary Proposed	WETLANDB_P
WETLANDB_X	Wetland Boundary Existing	WETLANDB_X
WLINE_P	Water Pipe Proposed	WLINE_P
WLINE_X	Water Pipe Existing	WLINE_X
WMTR_P	Water Meter Proposed	WMTR_P
WMTR_X	Water Meter Existing	WMTR_X
WRSR_P	Water Riser Proposed	WRSR_P
WRSR_X	Water Riser Existing	WRSR_X
WVLV_P	Water Valve Proposed	WVLV_P
WVLV_X	Water Valve Existing	WVLV_X
XWALK_X	Crosswalk	XWALK_X

2.7 Existing Naming Conventions

ITD has not traditionally required that naming conventions be used for InRoads resources, so there are not many existing naming conventions to analyze. However, a convention that has been frequently used, but that has not been documented explicitly, is the inclusion of the project key number in InRoads data resource names. This will be a documented convention in the new CADD and design standards. Users will be expected to follow this convention, as well as many others that are outlined in this document, once the new design standards have been implemented.

2.8.1 Existing Ground Surface Use Policies and Practices

The discussions that have been held to date have been very useful in determining how existing ground surfaces are currently being used. The meeting that was held with the InRoads users on March 4th provided further knowledge about the general workflow used to get surface data into InRoads and produce finished designs.

The way original ground surfaces are used on projects varies quite widely. There are no firm policies pertaining to how they are created, named, and stored. It depends largely on who is developing the project and how the surface data has been collected. A variety of methods are currently used for surface point generation, including aerial mapping, ground survey, quad sheets, etc.

Generally, users are encouraged to break the original ground representation into smaller surfaces, but this is not always adhered to. Existing ground surfaces are generally stored in the project directory, although there are exceptions where users have stored surface information elsewhere, such as in another folder on the server, or in some instances, on a local drive.

Since the majority of the design work is done in the districts, these offices have control over how the surfaces get created. Some districts have Location sections that do the preliminary survey and surface development work. Others do not. Some districts also frequently work with consultants to generate surface point data.

2.8.2 Surface Creation Processes

Data collection software that was developed in-house is used along with Fieldworks to collect and prepare survey information. However, there are some apparent differences in how the software is being used between districts. Fieldworks will be replaced with InRoads Survey once the implementation of the standards and new design software is complete. District 2 has already done some preliminary experimentation with InRoads Survey.

Most ITD survey crews are using the Topcon data collector and a third party adjustment program to collect and manipulate the field-generated data. District 3 is using the PacSoft civil survey software. Most survey crews are also using Trimble GPS units.

The feature codes that are used in the survey software and the feature style names that are used in InRoads are currently the same. This applies to the survey data that is collected by ITD personnel. However, consultant contract surveyors are being used more frequently to collect survey data. To a large degree, there are no specific software use requirements for these contracts. Data is generally delivered in ASCII x,y,z coordinate files, either with or without break line information.

All districts typically review survey data to check for surface spikes. If aerial surveys are conducted, survey crews are often sent out to perform spot checks to verify the survey data and to ensure that it is suitable for use in generating reasonably accurate existing ground surfaces for InRoads. Once the survey data has been verified, it is imported to create surfaces for the project.

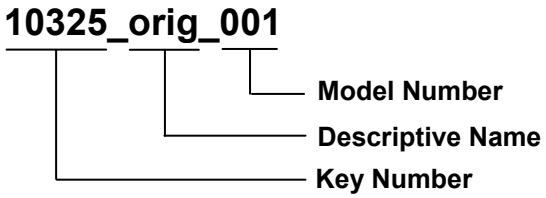
2.8.3 Storage Location for Existing Ground Surfaces

A standard project directory structure has been created with a provision for the storage of InRoads data files, such as existing ground surfaces. The approved storage location for these data files is shown below:

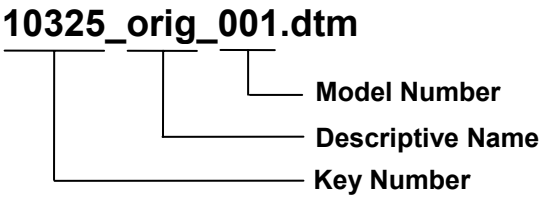
Prj#####\Project_Development\Civil_Data

2.8.4 Naming Conventions for Existing Ground Surfaces

Existing or original ground surface names will include the project key number, the descriptive name “orig” to indicate that the surface represents original or existing ground, and a model number to indicate surface sequence, as shown in the example below:



The .DTM files that are saved in the civil data folder location in the project directory structure will use the same naming convention, as illustrated in the example below:



The description will include the date, the route number, and a brief explanation of the purpose of the surface, as shown in the example below:

3/17/03 I-15 project original ground surface

2.8.5 Drawing Type and Level Placement for Existing Ground Surfaces

During the design process, InRoads graphics will be displayed many times to determine the validity of various proposed designs. These graphics will generally be displayed in a temporary working file until the final surface is determined, at which time selected graphics will be displayed in one of the permanent drawing types that have been approved for use with the new ITD CADD and design standards.

Surface triangles, break lines, contours, and other related data would also typically be displayed in the working file while the surface is being developed. However, some surface information, such as break lines and contours, may eventually be displayed on levels that are reserved for this purpose in the Topography or Design drawing types. These levels have display properties assigned to them, including color, style, and weight. The InRoads preferences and styles that are used to generate the graphics have been coordinated with these level properties.

2.9.1 Subgrade Surfaces

While various design options are being explored, the InRoads design software is used to build the roadway prism from the top down, or from finished grade to existing ground. During the construction process, however, the order is the opposite, meaning that the roadway prism is built from the bottom up, or from existing ground to finished grade. Because InRoads can be used in both design and construction, the Idaho Transportation Department has need to model proposed designs using standard template layers that represent the subgrade surface conditions and materials.

The ITD Specifications for Highway Construction contains the following pay items, which represent the material surface types that may be used during a construction project:

- Sub-Subgrade
- Subgrade
- Granular Subbase
- Aggregate Base
- Pavement

These surfaces will be represented on the templates that are included in the standard template library and will be copied to new project folders that are created with the Project Builder application. The following surfaces are not considered pay items, but are critical during the initial design process in InRoads:

- Existing Ground
- Finished Grade

These surfaces will also be included as layers on the standard templates.

2.9.2 Template Layer/Subgrade Surface Naming Convention

A standard naming convention is needed for subgrade surfaces to provide a level of consistency when surface models and reports are generated. The table below contains the naming conventions that will be used for template layers and subgrade surfaces.

Template Layer/Subgrade Surface Names	Surface Names (When Saved to DTM)
Sub-Subgrade	12345_<street or route number>_subs_001.dtm
Subgrade	12345_<street or route number>_subg_001.dtm
Granular Subbase	12345_<street or route number>_gran_001.dtm
2” Aggregate for Base	12345_<street or route number>_2ag_001.dtm
1” Aggregate Type A For Base	12345_<street or route number>_1aga_001.dtm
1” Aggregate Type B For Base	12345_<street or route number>_1agb_001.dtm
3/4” Aggregate Type A For Base	12345_<street or route number>_34aga_001.dtm
3/4” Aggregate Type B For Base	12345_<street or route number>_34agb_001.dtm
1/2” Aggregate For Base	12345_<street or route number>_12ag_001.dtm
3/8” Aggregate For Base	12345_<street or route number>_38ag_001.dtm
Open-Graded Rock Base (Rock Cap)	12345_<street or route number>_rkbs_001.dtm
Cem Rec Asphalt Base Stab	12345_<street or route number>_cmbs_001.dtm
Finished Grade	12345_<street or route number>_fngd_001.dtm

2.9.3 Storage Location for Existing Ground Surfaces

Design surfaces will be stored with other InRoads resources in the project directory structure in the location shown below:

Prjnnn\Project_Development\Civil_Data

2.9.4 Drawing Type and Level Placement for Design Surfaces

Essentially, the same rules that apply to the display of existing ground surfaces will also apply to design surfaces. Surface graphics, such as triangles, break lines, and contours, may be displayed in the InRoads working design file until the final design is determined. Selected graphics may then be displayed on levels that are reserved for this purpose in the Design drawing type. The display properties for the surface component graphics will be governed by preferences and styles that have been coordinated with the level property information contained in the NetSPEX CADD standards database.

2.10.1 Geometry Project Practices

Geometry projects have traditionally been used in various ways by the district offices. This is mostly due to the fact that standard practices that govern how projects are named, stored, and shared during the course of a project have not yet been firmly established. The Idaho Transportation Department would like to develop standards to

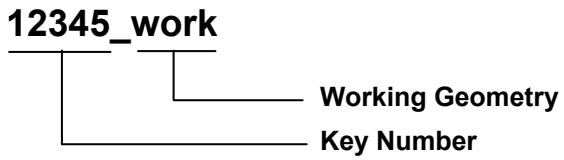
promote better collaboration on design projects and to provide methods to improve the management of alignment revisions.

There are currently no clearly defined restrictions that govern how geometry project data is generated, stored, or managed. As a general unwritten rule, alignments have traditionally been stored in one geometry project, although anyone who is working on a roadway project could conceivably create new geometry projects without any constraints. The main geometry project described above is generally stored in the project folder on the district servers and is often named using the project key number. However, a review of some sample project directory structures from district offices revealed that many geometry projects and geometry files are commonly named, for example, with the CADD user's first or last name.

ITD and ProSoft discussed at length the idea of requiring the use of a single "working" geometry file in which all of the revisions of alignment data that are generated during the course of project development are stored. When the final horizontal centerlines and vertical alignments are chosen, this data will be copied to a finished geometry project. This will alleviate any question of which alignment geometry represents the finished design.

2.10.2 Internal Naming Convention for Geometry Projects

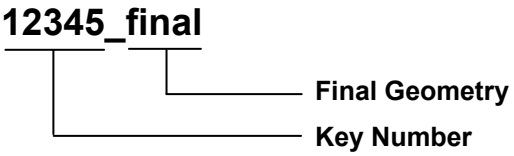
The primary working geometry project and geometry file will be named using the project key number, an underscore, and the word "work" to indicate that the project contains working geometry, as shown in the example below:



The description will include the date, the route number, and a brief explanation of the purpose of the geometry project, as illustrated in the example below:

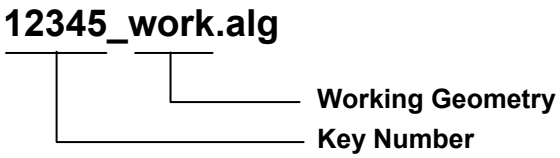
3/17/03 I-15 expansion geometry project

To make clear which revision of the alignments represents final project geometry, the completed alignments will be copied to a new geometry project that uses the project key number and the word "final" in its name, as shown below:



2.10.3 Naming Convention for Geometry Files

Geometry files will be named using the same convention as geometry projects. The primary working geometry file will be named using the project key number, an underscore, and the word "work" to indicate that the file contains working project geometry, as shown in the example below:



Final geometry will be saved to a geometry file that includes the project key number and the word "final" in its name, as shown in the example below:

2.10.4 Standard Storage Location for Geometry Projects

Geometry projects will be stored with other InRoads resources in the project directory structure in the location shown below:

Prjnnn\Project_Development\Civil_Data

2.11.1 Alignment Use Practices

The method used to generate alignments is, by its very nature, dependent on the constraints of the design. The InRoads design software provides many ways to generate alignments. The options are even more extensive in InRoads SelecCAD 8.2. During the meeting that was held with key InRoads users on March 4th 2003, it became apparent that a variety of alignment generation methods are used. Horizontal and vertical controls are also often used to assist with modeling operations. It is not unusual for a combination of MicroStation and InRoads tools to be used to import and create horizontal and vertical alignments. For example, while InRoads alignment generation tools are commonly used for the layout of the horizontal centerline, some users may employ other methods, such as the generate alignment from graphics method. For vertical alignments, MicroStation tools are sometimes used in profile to place points of vertical intersection. The selected method depends largely on the application and in some cases, the user's comfort level with the InRoads alignment tools.

For the reasons stated above, there are not, nor will there be, any prescribed practices or methodologies for alignment generation. The user will continue to be allowed to determine which alignment creation method is best suited for the condition that they are attempting to model.

However, as mentioned earlier, there will be one working geometry project that will be used to store all alignment geometry for a roadway project. This may represent a

departure in workflow for some users who are accustomed to storing preliminary alignments in their own geometry projects.

Currently, there is no prescribed workflow or convention that governs how design intent is communicated to engineers and designers who are collaborating on project development. Similarly, there is no practice that defines how alignment revisions are managed. This will, however, be addressed with the new alignment naming conventions and storage policies.

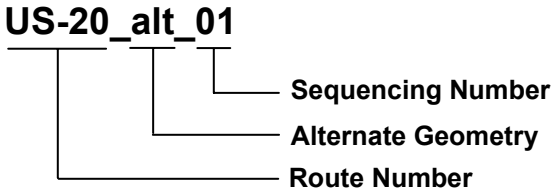
2.11.2 Symbology for Alignments

Alignment symbology has been defined in the appropriate ITD drawing types. For example, in addition to the InRoads working design file that will be used for the temporary display of alignment graphics during project development, horizontal alignments may also eventually be displayed in the Design drawing type on the RDWY_HALIGN level (level 14), which has been designated as the storage level for roadway centerline data. In a similar manner, the Profile drawing type will use the RDWY_VALIGN level (level 14) as the designated level for the display and storage of vertical alignments. A specific set of color, style, and weight symbology has been assigned to each of these levels. To ensure that display properties are applied uniformly in both MicroStation and InRoads, these symbology settings will be stored in both the NetSPEX standards database and in the InRoads geometry style files.

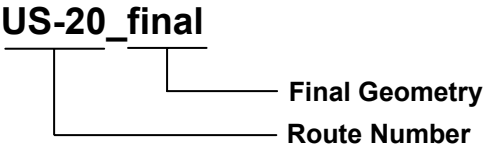
2.11.3 Naming Conventions for Horizontal Alignments

Horizontal alignments are typically used to represent the main line of ITD roadway projects. Generally, therefore, the main horizontal alignment will be named with the route number, as shown in the example below:

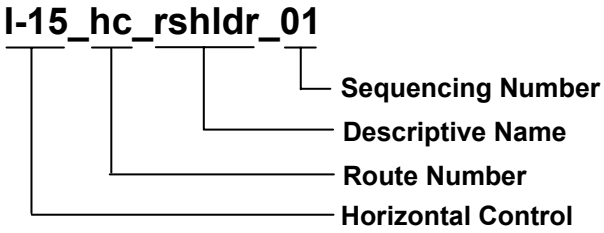
Occasionally, alternate horizontal alignments will be used to explore additional design options. For these alignments, the name will include the route number, an underscore, the letters “alt” to indicate that it represents alternate geometry, another underscore, and a sequencing number, as shown in the example below:



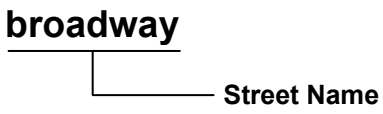
The final horizontal alignment geometry for the project will be named using the route number, an underscore, and the word “final”, as shown in the example below:



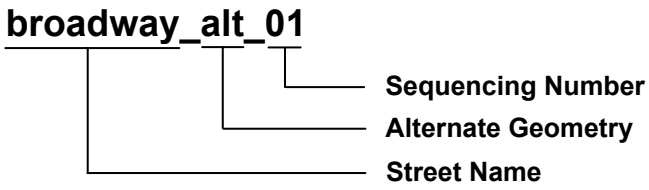
InRoads users often employ horizontal and vertical controls for modeling purposes. To distinguish these controls from other horizontal alignments, names will include the route number, the letters “hc” to designate the alignment as a horizontal control, a descriptive name that indicates alignment purpose (this could be the transition control name if appropriate), and a sequencing number, as shown in the example below:



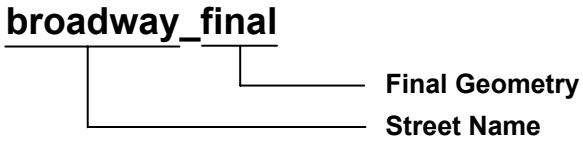
Alignments for streets or cross streets will simply include the street name, as illustrated in the example below:



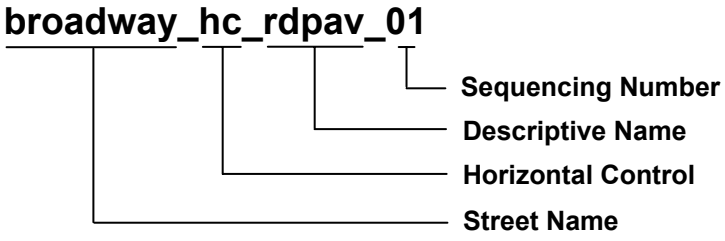
Alternate alignments for streets or cross streets, if employed, will include the street name, an underscore, the letters “alt”, and a sequencing number, as shown in the example below:



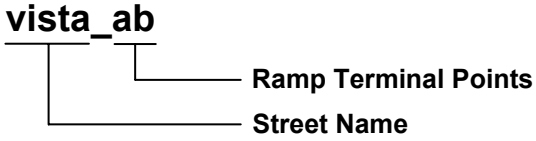
Final alignments for streets or cross streets will include the street name, an underscore, and the word “final”, as shown in the example below:



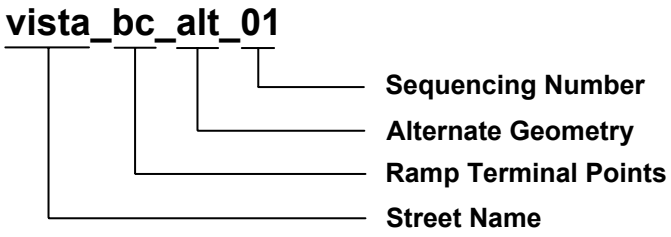
If horizontal controls are used when modeling cross streets, names should include the street name, the letters "hc" to designate the alignment as a horizontal control, a descriptive name (this could be the transition control name if appropriate), and a two-digit sequencing number. The major components of the name should be separated by underscores, as shown in the example below:



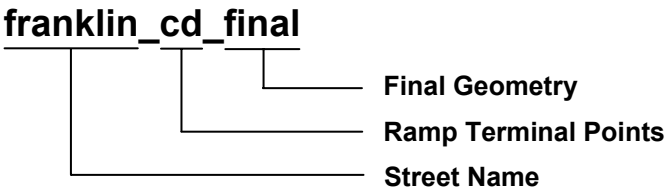
Ramp alignments will include the name of the street to which the ramp will connect, an underscore, and a two-letter code representing the terminal points of the alignment, as shown in the example below:



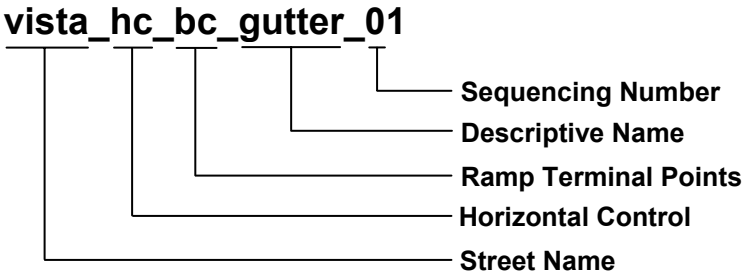
Alternate ramp alignments will include the name of the street to which the ramp will connect, an underscore, a two-letter code representing the terminal points of the alignment, another underscore, the letters “alt”, and a sequencing number, as illustrated in the example below:



Final ramp alignments will include the name of the street to which the ramp will connect, an underscore, a two-letter code representing the terminal points of the alignment, another underscore, and the word “final”, as shown in the example below:



If horizontal controls are employed when modeling ramps, the name will include the street name, the letters “hc” to distinguish the alignment as a horizontal control, a two-letter code representing the terminal points of the centerline alignment, a descriptive name that indicates alignment purpose (this could be the transition control name if appropriate), and a sequencing number. The major components of the name will be separated by underscores, as shown in the example below:

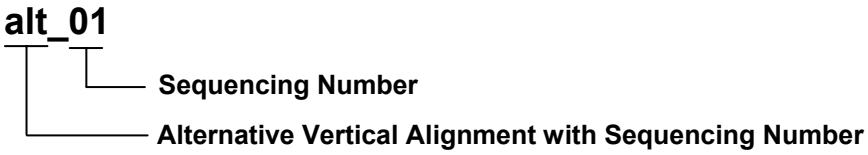


Descriptions will include the date, the route number, and a brief explanation of the purpose of the alignment, as illustrated below.

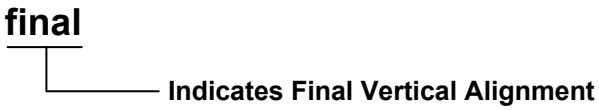
3/17/03 I-15 main line alignment

2.11.4 Naming Conventions for Vertical Alignments

Vertical alignments are considered the children of the horizontal alignments that are generated by InRoads. For this reason, the need to use descriptive names that include the route number is eliminated. Vertical alignment names will simply consist of the letters “alt” to indicate that the alignment represents preliminary or alternative geometry, an underscore, and a sequencing number to differentiate between alignment revisions. An example of this convention is shown below:



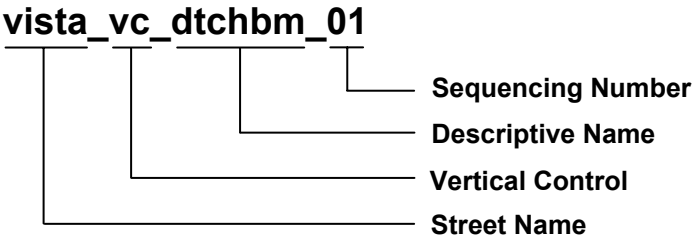
When the final vertical alignment is determined, its name will simply consist of the word “final”, as illustrated in the example below:



The description will include the date, the route number, and a brief explanation of the purpose of the alignment, as shown in the example below.

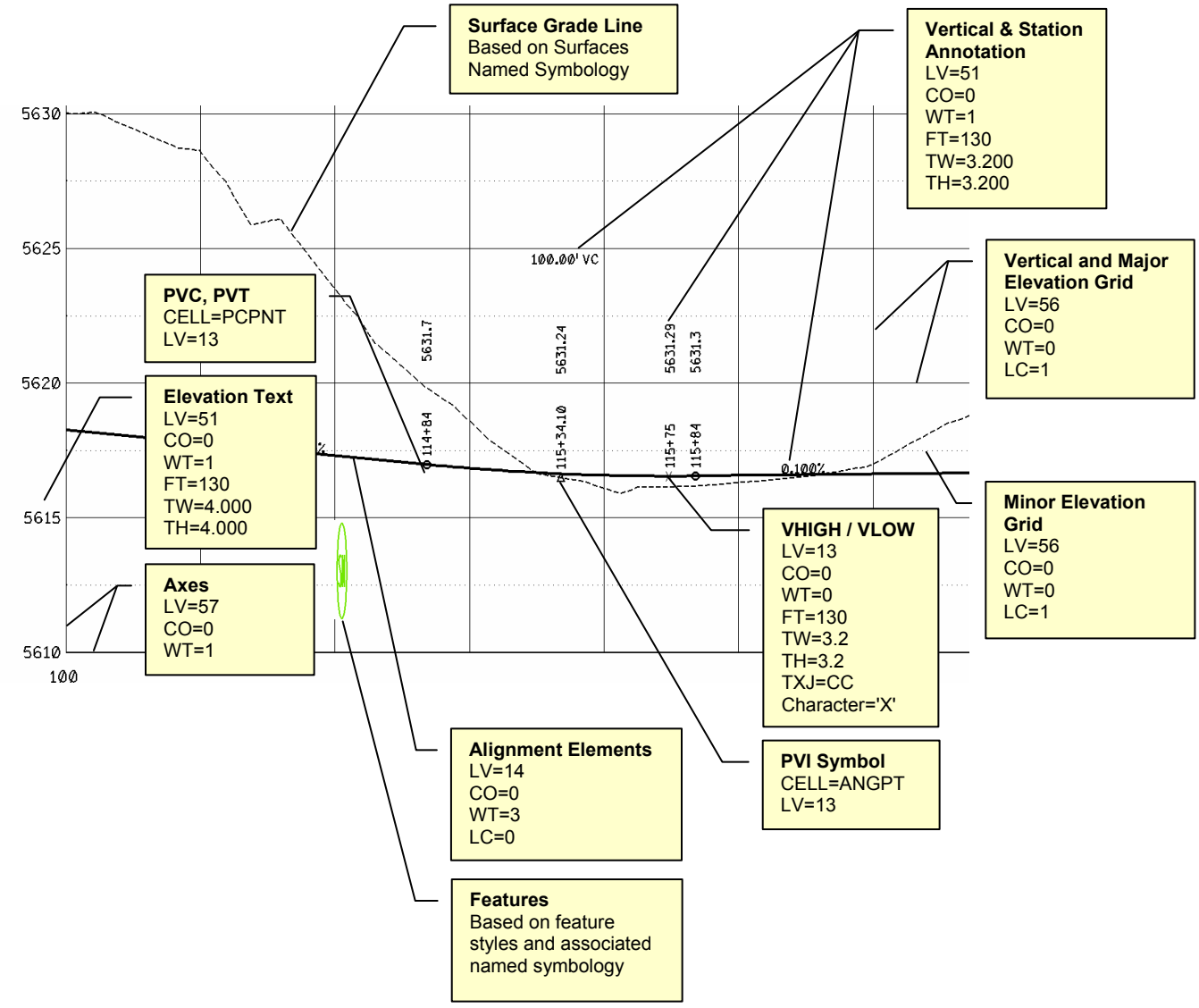
3/17/03 I-15 main line vertical alignment

If vertical controls are employed during the course of the project, names should include the street name, an underscore, the letters "vc" to distinguish the alignment as a vertical control, another underscore, a descriptive name that defines the alignment purpose (this could be the transition control name if appropriate), and a two-digit sequencing number, as shown in the example below:



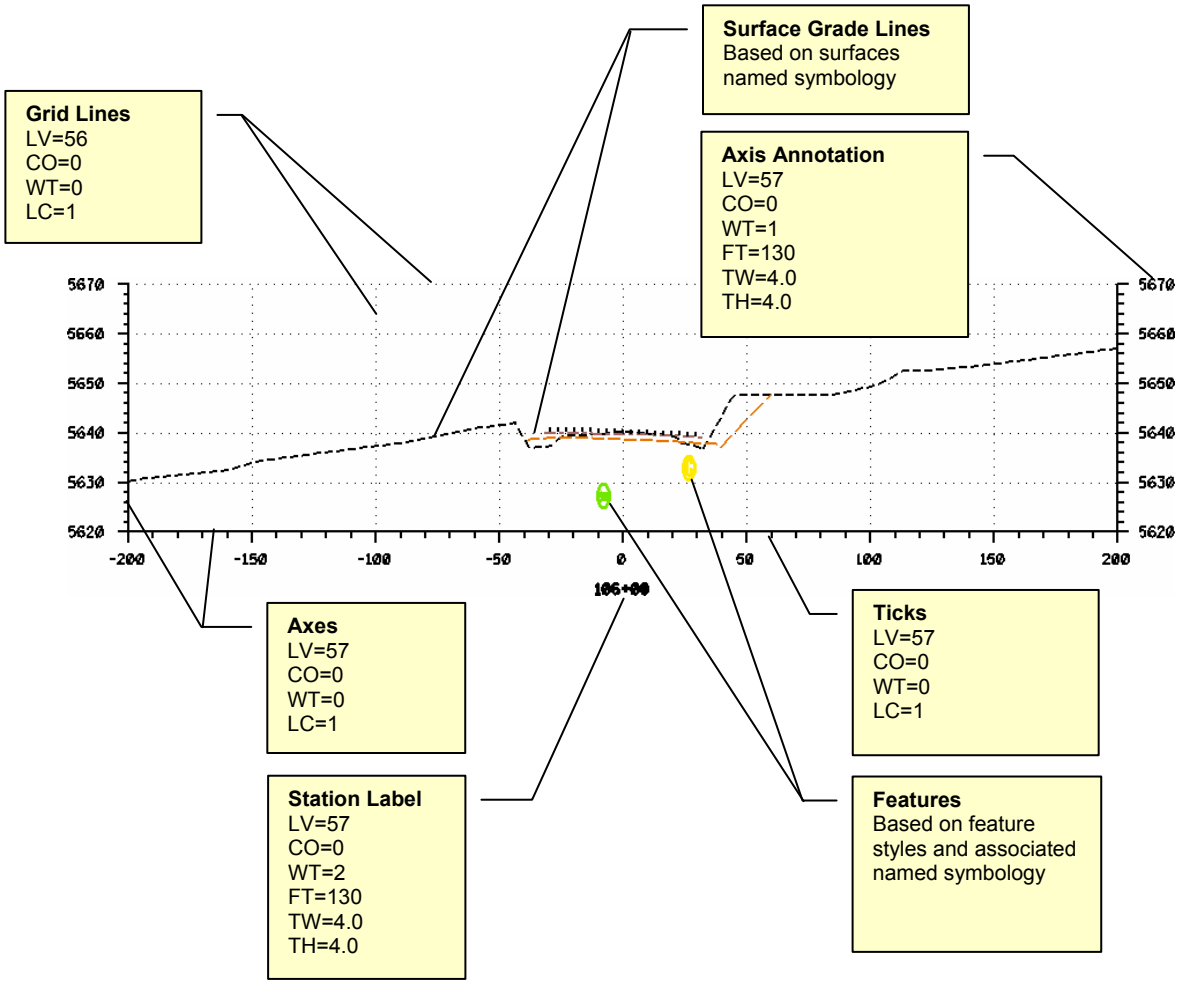
2.12.1, 2.12.2 Profile Window Appearance / Symbology / Annotation Standards

Levels and properties have been defined in the Profile model drawing type and Plan sheet drawing type. The profile window appearance standards are shown in the diagram below.



2.13.1, 2.13.2 Cross Section Appearance / Symbology / Annotation Standards

Cross sections are not typically included in Idaho Transportation Department plan sets, although they are made available to consultants and contractors when requested. A specific drawing type for cross sections has not been defined. However, they can be displayed in the InRoads working design file when needed. The diagram below contains the appearance and symbology standards for cross section windows.



2.14.1 Guidelines and Procedures for Modeling Tools

The basic workflow for generating concept plans was discussed during the meeting with a representative group of InRoads users on March 4th 2003. The modeling tools play an integral role in the development of these plans. Following are the basic steps:

- Review survey data, aerial survey data, and generate surface
- Determine the scale of the project
- Layout horizontal alignment alternatives
- Review/check the alignment(s) for viability
- Layout vertical alignment alternatives
- Define simple templates and decision tables to explore design alternatives
- Create simple roadway definition
- Run the Roadway Modeler tool to measure results

For preliminary plan sets, the same basic workflow is followed, except that the horizontal and vertical alignments have generally been finalized by the time the modeling tools are used.

Intersections are usually designed by modeling the main line first, the cross streets in a separate operation, and then merging the finished design surfaces to create a completed intersection model. However, additional options for modeling intersections will be available with the implementation of InRoads SelecCAD 8.2. Several InRoads users expressed an interest in learning about these options during the training.

Some of the graphics in the plan sets that could potentially be generated by the InRoads tools are often created with MicroStation tools. Much of this may be do to the perception by some users that the MicroStation graphics are easier to produce, coupled with a lack of understanding about how to generate similar features in InRoads. The implementation of design standards that will be used during the modeling process, together with the training on InRoads SelecCAD 8.2 topics, will help to alleviate many of these issues. Furthermore, in many instances it may continue to be easier to generate certain features with MicroStation and NetSPEX tools. The user will continue to have the option to choose the appropriate method for specific design tasks. Regardless of the software used, standards-compliant drawing components or feature styles and named symbologies will set appropriate display properties.

2.14.2 Decision or Cut and Fill Tables

The Idaho Transportation Department helped to pioneer the development of decision tables and this feature is used frequently to model slope conditions. Cut and fill tables may be used on some projects as well. ITD will implement four standard decision tables, although users will be permitted to develop other decision tables when necessary. Following is a description of the standard decision tables.

Decision Table	Description
A-1	Variable Slope Option for Freeways
A-2	Variable Slope Option - 50' from Hinge
A-2 Curb-n-Gutter	Variable Slope Option for Curb-n-Gutter - 50' from Hinge
A-3	Variable Slope Option - 30' from Hinge
A-4	Variable Slope Option - 20' from Hinge

User-generated table names should include the route number, a grading type description, a catch point description, and a sequencing number, as shown in the example below:

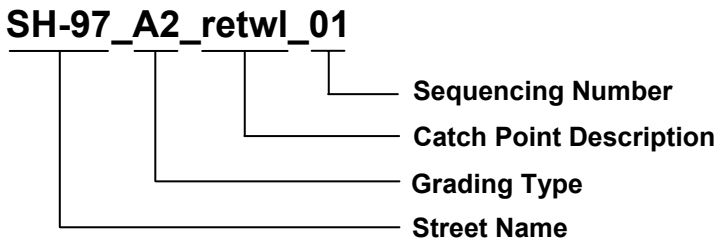


Table descriptions should include the date, the route number, a brief explanation of its purpose, and the station range, as shown in the example below:

8/3/03 SH-97 mainline A2 std. w/ret. wall 105+00 through 106+90

2.15.1 Template Library Practices

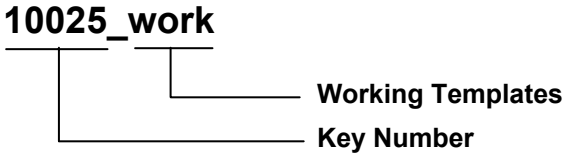
The use of template libraries has not typically been regulated at the Idaho Transportation Department. Since there have been no limitations on the number of template libraries that can be created, no restrictions on who can access these libraries for editing purposes, and no formal guidelines concerning what naming conventions are employed when they are created, users have been free to employ them in whatever manner they deem appropriate. By virtue of the way that InRoads models designs with the extensive use of templates, however, the ability to develop additional templates on an as-needed basis will continue to be necessary, although future template modification and storage will be limited to a single working template library for each project. This working template library will contain standard templates that have been defined for each specific type of roadway that would typically be constructed during a project. The standard templates are listed in the table under the description of Task 2.15.6. They are designed for use as prototypes for the construction of other project templates. Once the templates to be used on the final design have been determined, they will be copied to a final version of the template library that will simplify the recognition of final templates and facilitate the archiving of templates when the project is completed.

Template libraries have been typically stored in the project folder on district CAD servers. This practice will continue, as template libraries will be stored with the other InRoads resources in the Prj#####\Project_Development\Civil_Data folder.

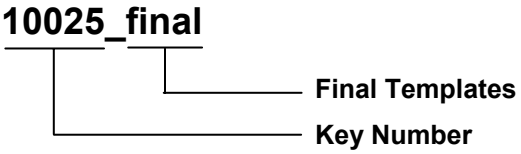
When InRoads SelecCAD 8.2 is introduced, new modeling capabilities that employ feature styles will be made available for use with the templates and modeling tools. The Idaho Transportation Department will use these new capabilities on future roadway design projects.

2.15.2, 2.15.3 Naming and Description Convention for Template Libraries

The working template library that is described in Task 2.15.1 above will use the project key number and the word “work” in the internal name that displays when the template library is opened in InRoads, as shown in the example below:



Names for template libraries that contain the final project templates will consist of the project key number, an underscore, and the word “final” to designate that the file contains final templates, as illustrated in the example below:

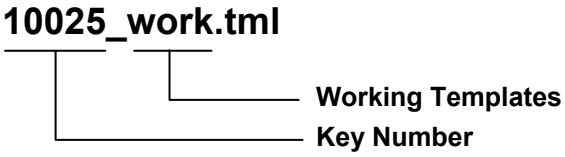


The description will include the date, the route number and a brief explanation of the purpose of the template library:

3/17/03 I-15 typical sections

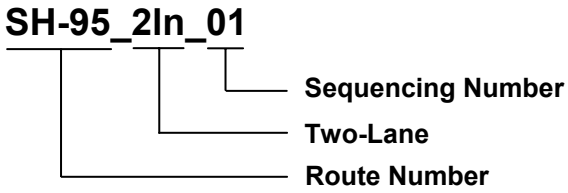
2.15.4 Naming Convention for Template Library Files

Template library files that are saved to the InRoads resources folder location on the server will follow the same naming conventions as internal names, as shown in the examples below:



2.15.5 Naming and Description Convention for Templates

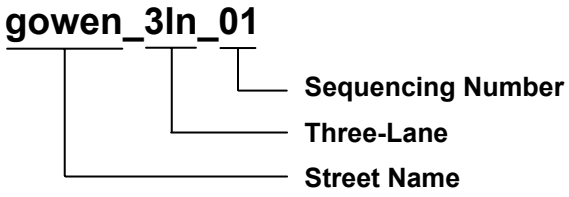
Template names will include descriptive information, such as the route number, the number of lanes that the template will model, and a two digit sequencing number to designate template order. For example, a two-lane template for a section of highway on Idaho State Highway 95 would be named as follows:



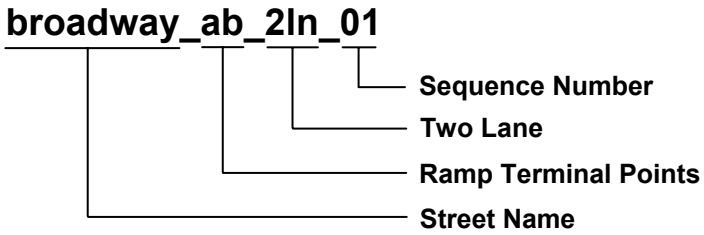
The description will include the date, route number, short indication of the template's purpose, and the station range in which the template will be used, as shown in the example below:

3/17/03 SH-95 mainline two-lane from 12+00 to 13+00

For cross streets, ramps, and other special cases, additional naming conventions will be required. Cross streets will use the name of the cross street, an underscore, the number of lanes that the template is intended to model, an underscore, and a two digit sequencing number to designate template order, as illustrated in the example below:



A ramp template will include the name of the street to which the ramp will connect, an underscore, the letters denoting the terminal points of the ramp alignment, an underscore, the number of lanes that the template is intended to model, an underscore, and a two digit sequencing number to designate template order, as shown in the example below:



2.15.6 Templates in Prototype Library

Several standard templates will be included in the working template library that will be copied by the Project Builder application to new project directory structures. The Idaho Transportation Department has created MicroStation drawings that diagram the segment dimensions and slopes that will be used on these standard templates. There are five standard templates that will be created for all new projects: one for interstate design and four for urban and rural design. The standard templates are included in the table below.

Template	Description
A-1	A-1 Std. Freeway Grading
A-2	A-2 Std. Rural Principal Arterial
A-2 Curb-n-Gutter	A-2 Std. Rural Principal Arterial w/ Curb-n-Gutter
A-3	A-3 Std. Rural Minor Arterial
A-4	A-4 Std. Rural Major Collector

2.15.7 Transition Control Names in Drawing Type Spreadsheets

Transition control names have been defined in each of the drawing type spreadsheets. To allow consistent naming to be used throughout the entire design process, the Idaho Transportation Department will use the same names for transition controls as are assigned to the feature styles that are stored in the preferences. These names have been verified and reviewed to prepare for inclusion with the InRoads resources. The table below contains a list of the approved transition control names.

Transition Control	Description
Bench	Reserved Bench
Centerline	Reserved Centerline
CUT	Cut Slope
Default	Default TC
Ditch Backslope	Reserved Ditch Backslope
Ditch Bottom	Reserved Ditch Bottom
Ditch Foreslope	Reserved Ditch Foreslope
DTCHBTM_P	Reserved Ditch Bottom
FILL	Fill Slope
Hinge	Reserved Hinge
HINGE_B	Hinge - BASE
HINGE_F	Hinge - FINISH
HINGE_S	Hinge - SUB
L1_B	Left Segment 1 BASE
L1_F	Left Segment 1 FINISH
L1_S	Left Segment 1 SUB
L2_B	Left Segment 2 BASE
L2_F	Left Segment 2 FINISH
L2_S	Left Segment 2 SUB

L3_B	Left Segment 3 BASE
L3_F	Left Segment 3 FINISH
L3_S	Left Segment 3 SUB
L4_B	Left Segment 4 BASE
L4_F	Left Segment 4 FINISH
L4_S	Left Segment 4 SUB
L5_B	Left Segment 5 BASE
L5_F	Left Segment 5 FINISH
L5_S	Left Segment 5 SUB
L6_B	Left Segment 6 BASE
L6_F	Left Segment 6 FINISH
L6_S	Left Segment 6 SUB
L7_B	Left Segment 7 BASE
L7_F	Left Segment 7 FINISH
L7_S	Left Segment 7 SUB
L8_B	Left Segment 8 BASE
L8_F	Left Segment 8 FINISH
L8_S	Left Segment 8 SUB
L9_B	Left Segment 9 BASE
L9_F	Left Segment 9 FINISH
L9_S	Left Segment 9 SUB
L10_B	Left Segment 10 BASE
L10_F	Left Segment 10 FINISH
L10_S	Left Segment 10 SUB
R1_B	Right Segment 1 BASE
R1_F	Right Segment 1 FINISH
R1_S	Right Segment 1 SUB
R2_B	Right Segment 2 BASE
R2_F	Right Segment 2 FINISH
R2_S	Right Segment 2 SUB
R3_B	Right Segment 3 BASE
R3_F	Right Segment 3 FINISH
R3_S	Right Segment 3 SUB
R4_B	Right Segment 4 BASE
R4_F	Right Segment 4 FINISH
R4_S	Right Segment 4 SUB
R5_B	Right Segment 5 BASE
R5_F	Right Segment 5 FINISH
R5_S	Right Segment 5 SUB
R6_B	Right Segment 6 BASE
R6_F	Right Segment 6 FINISH
R6_S	Right Segment 6 SUB
R7_B	Right Segment 7 BASE
R7_F	Right Segment 7 FINISH
R7_S	Right Segment 7 SUB
R8_B	Right Segment 8 BASE
R8_F	Right Segment 8 FINISH
R8_S	Right Segment 8 SUB

R9_B	Right Segment 9 BASE
R9_F	Right Segment 9 FINISH
R9_S	Right Segment 9 SUB
R10_B	Right Segment 10 BASE
R10_F	Right Segment 10 FINISH
R10_S	Right Segment 10 SUB
Shoulder	Reserved Shoulder
Superelevation 1	Reserved Superelevation 1
Superelevation 2	Reserved Superelevation 2
TBCURB_P	Top Back of Curb
TEMP	Temporary Point - used w/Dec. Tables
Uncontrolled	Reserved Uncontrolled point

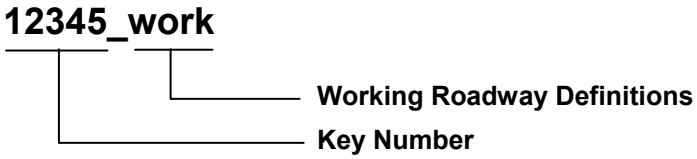
2.16.1 Roadway Library Practices

As with template libraries, the use of roadway libraries has not been widely regulated at the Idaho Transportation Department. Because roadway libraries are so situation-dependent, their use is, in fact, even more difficult to regulate than template libraries and generally it does not make sense to impose restrictions that could prove to be counterproductive. There is no desire on the part of ITD CADD administrators to place additional restrictions on their use, other than to minimize the number of roadway libraries in project folders by consolidating roadway definitions into a working roadway library, and by imposing a system of naming conventions on both roadway libraries and roadway definitions. These measures will, at a minimum, improve the ability of software users to collaborate on design projects by providing uniform, recognizable names, and a common storage structure.

Once the roadway definitions to be used on the final design have been determined, they will be copied to a final version of the roadway library that will facilitate archiving of the roadway definitions that are relevant to the final design.

2.16.2, 2.16.3 Naming and Description Convention for Roadway Libraries

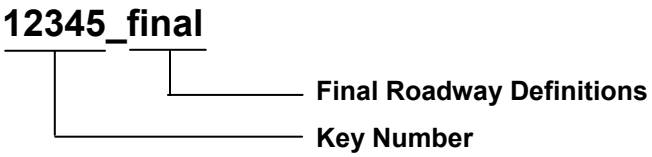
The internal name for roadway libraries that displays when the library is opened in InRoads will include the project key number, an underscore, and the word “work” for both internal names and external library names, as shown in the example below:



Roadway library descriptions will include the date, route number, and short indication of the purpose of the roadway library, as illustrated below:

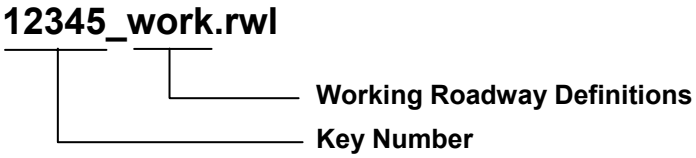
3/17/03 SH-95 project roadway definitions

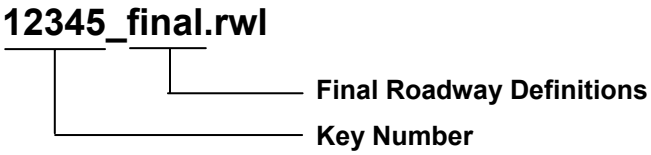
Names for roadway libraries that contain the final roadway definitions for the project will consist of the project key number, an underscore, and the word “final” to designate that the file contains final roadway definitions, as shown in the example below:



2.16.4 Naming Convention for Roadway Library Files

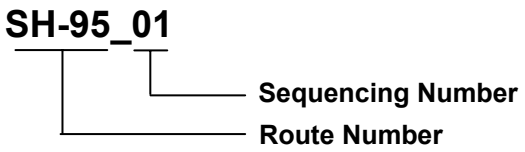
Roadway library files that are saved to the InRoads resources folder location on the server will follow the same naming conventions outlined in task 2.16.2 above:



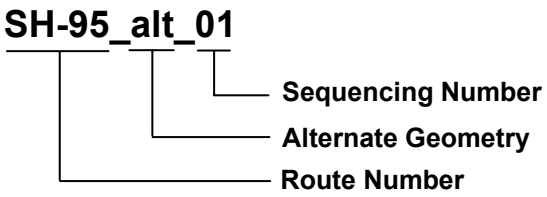


2.16.5 Naming and Description Conventions for Roadway Definitions

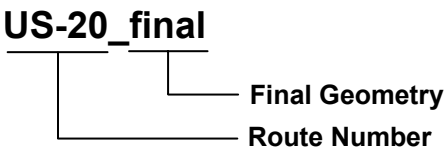
Roadway definition names for the main line of a roadway project will include the route number, an underscore, and a sequencing number. For example, a roadway definition for the main line of a section of highway on State Highway 95 would be named as follows:



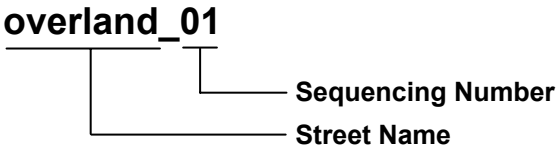
Occasionally, alternate roadway definitions may be used. For these roadway definitions, the name will include the route number, an underscore, the letters “alt” to indicate that it represents alternate geometry, and a sequencing number, as shown in the example below:



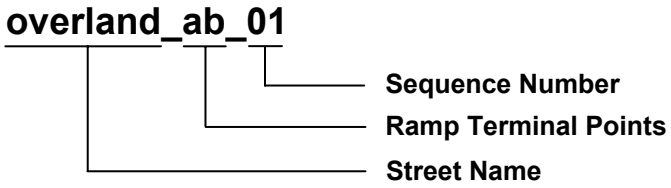
The final roadway definitions for the project will be named using the route number, an underscore, and the word “final”, as shown in the example below:



Roadway definitions for streets or cross streets will use the name of the cross street, an underscore, and a sequencing number, as illustrated in the example below:



Roadway definitions for ramps will include the name of the street to which the ramp will connect, an underscore, the letters denoting the terminal points of the ramp alignment, another underscore, and a sequencing number, as shown in the example below:



Descriptions will include the date, route number and station range, as shown below:

3/17/03 SH-95 main line from 12+00 to 13+00

2.17.1 Existing Report Formats

The district offices use some custom InRoads report formats that are accessed from district resource servers. To this point, however, no department-level standards have been established in regard to general or geometry reporting. The degree to which reporting standards should be implemented will depend largely on how ITD decides to regulate their use in the future. This has not yet been determined.

2.17.2 New Report Formats

In addition to the traditional ASCII and binary reporting capabilities that were available in previous versions of InRoads, InRoads SelectCAD 8.2 provides new and more flexible ways to generate reports in the Extensible Markup Language (XML) format. The software provides a number of standard style sheets to help a user determine the format in which XML reports are displayed in a browser window and the appearance of the report when printed. The XML Reports command can generate reports that include summary data from the active project and loaded surfaces, geometry information, station and offset values, clearance information, stakeout coordinates, and legal descriptions. Custom XML report style sheets can be created if necessary.

Until users begin to develop projects with InRoads SelectCAD 8.2, it will be difficult to anticipate whether or not custom formats will be needed while developing projects in InRoads. However, it will be important for the ITD CADD standards committee to review reporting practices a regular basis to determine if it makes sense to standardize certain report formats for Department use.

2.18 On-Site Meetings

A design standards review meeting was held in March of 2003, during which standard practices and procedures for using the InRoads software were discussed. Key members of the CADD standards committee and selected InRoads users attended the meeting. While this meeting provided ProSoft with significant information that will be useful for the development of design standards, additional on-site or teleconference meetings may be necessary during the course of the standards development project to further clarify certain requirements that are related to the ITD design standards or InRoads resources.

ProSoft Assessment

The design standards that are represented in this document are, in ProSoft's assessment, very comprehensive and ready for implementation with InRoads SelectCAD. The design standards have been carefully checked for conformity with the CADD standards that are being deployed with NetSPEX. InRoads users will find that the addition of naming conventions and approved workflows will greatly enhance their ability to use InRoads in a collaborative project environment. Consultants and contractors will also now have the ability to deliver their work in approved ITD formats.

While the design standards have been designed to address all aspects of the InRoads production workflow, they should be evaluated periodically to ensure that they meet the requirements of active ITD projects. Organizations that are usually most successful with standards implementation are typically those that allow the standard to be adaptable to new requirements. When the design standards are implemented, some users will have input and will request changes or enhancements that they feel are critical to their unique production workflows. Many of these suggestions will have validity. Others will be nothing more than personal preferences. The Idaho Transportation Department will have to weigh the significance of the requests to determine whether or not they are worthy of inclusion in subsequent releases of the design standards.

Ideally, a formal process, whether it is a Web-based request form, a printable request form, or some other method, should be employed to receive and evaluate user requests. However, if at all possible, immediate and frequent additions to the standard should usually be avoided in favor of a more measured and regulated release schedule. Too many revisions of a standard in a short time period can be confusing to a user and can have an impact on existing projects if not implemented with enough forethought and communication.